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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

HANNAHER, CONSTANTINE

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 06/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

09/967,143

Applicant(s)

DOTY, F. PATRICK

Examiner

Constantine Hannaher

Art Unit

2878

-- The MAILING DATE of this c m munication appears on th cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 September 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed January 17, 2002 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

A print-out is not a "copy".

Drawings

2. The drawings are objected to because of the substitute in Fig. 4 for the symbol for the unit microsecond. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. Section 608.01 of the MPEP states in part:

In order to minimize the necessity in the future for converting dimensions... to the metric system of measurements when using printed patents... all patent applicants should use the metric (S.I.) units followed by the equivalent English units when describing their inventions....

The Assistant Secretary and Commissioner of Patents and Trademark strongly reiterated and emphasized strong encouragement for patent applicants to use the metric system in patent applications in a message appearing at 1135 O.G. 55 dated February 18, 1992. At some future time, the USPTO will consider making it a requirement.

Note the use of the atmosphere, the micron, and the angstrom. The Examiner is unable to require the use of SI units.

Because acceptable units generally have internationally recognized symbols and names, it is not permissible to use abbreviations for their unit symbols or names, such as sec (for either s or second), sq. mm (for either mm² or square millimeter), cc (for either cm³ or cubic centimeter), mins (for either min or minutes), hrs (for either h or hours), lit (for either L or liter), amps (for either A or amperes), AMU (for either u or unified atomic mass unit), or mps (for either m/s or meter per second).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kress (US004419578A) in view of Carron *et al.* (US005399863A) and Newacheck *et al.* (US005334840A).

With respect to independent claim 1, Kress discloses a device for detecting neutrons (Fig. 4) comprising a detection body **10, 12** disposed between electrodes **16**, power supply means for applying a voltage (-V, see Fig. 1) to the electrodes **16**, and means **22** for detecting and measuring a signal response emitted by the detection body **10, 12** as the detection body is exposed to neutrons **26**. The detection body in the device of Kress is a neutron-sensitive first material **10** which may, itself, be a semiconducting material and a semiconducting second material **12** containing hydrogen which may, itself, be or contain a neutron-sensitive material (column 3, lines 27-52). A neutron-sensitive material which may be semiconducting and a semiconducting material which may contain a neutron-sensitive material is known from Carron *et al.* which teaches implantation of boron directly into an active semiconductor depletion region (column 5, lines 15-18) where the boron may be boron nitride (claim 3) and that boron nitride itself is a "common semi-conductor material" (column 3, lines 8-10). Boron nitride, especially of the "hexagonal" variety, is shown by

Newacheck *et al.* to have a number of advantages (column 2, lines 55-57). Although Kress suggests a few metals for the first material **10**, since Carron *et al.* identifies a neutron-sensitive, semiconducting material ("boron nitride" or boron implanted in silicon) which is required by the device of Kress, and Newacheck *et al.* teaches that boron nitride has a reduced toxicity in comparison to the radioactive metals suggested by Kress at column 4, line 25, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Kress to specify that the detection body **10**, at least, between electrodes **16** comprised hexagonal boron nitride for the reduced toxicity and machinability afforded thereby while retaining the features of neutron sensitivity and semiconductivity called for by Kress.

With respect to dependent claim 3, both Carron *et al.* and Newacheck *et al.* both describe the advantages of enriching with the isotope ^{10}B . It would have been obvious to one of ordinary skill in the art at the time the invention was made to enrich any boron nitride suggested by Carron *et al.* and Newacheck *et al.* in the device of Kress in view of the improved response to neutrons achieved thereby.

With respect to dependent claim 4, both Carron *et al.* and Newacheck *et al.* teach enrichment with the isotope ^{10}B in the claimed range. In view of the known advantage in neutron sensitivity afforded by enrichment in this isotope, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify any enrichment in the claimed range.

6. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kress (US004419578A) and Carron *et al.* (US005399863A) and Newacheck *et al.* (US005334840A) as applied to claim 1 above, and further in view of Moore *et al.* (1989).

With respect to dependent claim 2, although Kress and Carron *et al.* and Newacheck *et al.* do not identify the type of hexagonal boron nitride suggested, Moore *et al.* shows that "pyrolytic"

hexagonal boron nitride is a material long known and clearly suitable for the formulation of films (by CVD, see also “plate samples” at page 849). Since Kress and Carron *et al.* and Newacheck *et al.* leave the choice of hexagonal boron nitride to those of ordinary skill in the art, and Moore *et al.* confirms its suitability for forming a film, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the hexagonal boron nitride detection body **10** suggested by Kress and Carron *et al.* and Newacheck *et al.* was of the “pyrolytic” type.

With respect to dependent claim 7, Moore *et al.* shows that one or more of these forms of hexagonal boron nitride are known and clearly suitable for the formulation of films (by CVD, see also “plate samples” at page 849). Since Kress and Carron *et al.* and Newacheck *et al.* leave the choice of hexagonal boron nitride structure to those of ordinary skill in the art, and Moore *et al.* confirms its suitability for forming a film, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the hexagonal boron nitride detection body **10** suggested by Kress and Carron *et al.* and Newacheck *et al.* was one of the recited structures.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Poignant, Jr. *et al.* (US003887807A) in view of Newacheck *et al.* (US005334840A).

With respect to independent claim 5, Poignant, Jr. *et al.* discloses a process for detecting neutrons corresponding to the illustrated device (Fig. 2) which would comprise the steps of providing a detection body **24** disposed between electrodes **22**, **25** wherein the detection body **24** comprises boron nitride (column 5, line 61), exposing the detection body **24** to neutrons **21**, and measuring a signal produced as the result of a conversion process within the boron nitride (column 10, lines 1-3, as the claim places no limitation on what a signal is or how it is measured and accordingly a charge pattern and its development are considered to correspond to these claim elements), wherein neutrons **21** incident of the detection body **24** are converted to a plurality of

detectable energetic charged particles (see especially Fig. 3). The neutrons in flux 21 are thermal in view of the utility expressed at column 2, lines 2-3 and the consideration of specifically “thermal” neutron absorption in Table I for the elements making up detection body 24. Poignant, Jr. *et al.* does not specify “hexagonal” boron nitride. Newacheck *et al.* shows that hexagonal boron nitride can be formulated into a film 19 exactly as required by Poignant, Jr. *et al.* (column 5, lines 56-61). Since Poignant, Jr. *et al.* leaves the choice of boron nitride to those of ordinary skill in the art, and Newacheck *et al.* confirms its suitability for forming a film and other advantages (column 2, lines 55-57), it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the boron nitride detection body 24 suggested by Poignant, Jr. *et al.* was of the “hexagonal” type.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Poignant, Jr. *et al.* (US003887807A) and Newacheck *et al.* (US005334840A) as applied to claim 5 above, and further in view of Moore *et al.* (1989).

With respect to dependent claim 6, although Poignant, Jr. *et al.* and Newacheck *et al.* do not identify the type of hexagonal boron nitride suggested, Moore *et al.* shows that “pyrolytic” hexagonal boron nitride is a material long known and clearly suitable for the formulation of films (by CVD, see also “plate samples” at page 849). Since Poignant, Jr. *et al.* and Newacheck *et al.* leave the choice of hexagonal boron nitride to those of ordinary skill in the art, and Moore *et al.* confirms its suitability for forming a film, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the hexagonal boron nitride detection body 24 suggested by Poignant, Jr. *et al.* and Newacheck *et al.* was of the “pyrolytic” type.

Response to Submission(s)

9. The amendment filed January 17, 2002 has been entered.

10. The papers filed on January 17, 2002 (certificate of mailing dated November 30, 2001) have not been made part of the permanent records of the United States Patent and Trademark Office (Office) for this application (37 CFR 1.52(a)) because of damage from the United States Postal Service irradiation process. The above-identified papers, however, were not so damaged as to preclude the USPTO from making a legible copy of such papers. Therefore, the Office has made a copy of these papers, substituted them for the originals in the file, and stamped that copy:

COPY OF PAPERS
ORIGINALLY FILED

If applicant wants to review the accuracy of the Office's copy of such papers, applicant may either inspect the application (37 CFR 1.14(d)) or may request a copy of the Office's records of such papers (*i.e.*, a copy of the copy made by the Office) from the Office of Public Records for the fee specified in 37 CFR 1.19(b)(4). Please do **not** call the Technology Center's Customer Service Center to inquiry about the completeness or accuracy of Office's copy of the above-identified papers, as the Technology Center's Customer Service Center will **not** be able to provide this service.

If applicant does not consider the Office's copy of such papers to be accurate, applicant must provide a copy of the above-identified papers (except for any U.S. or foreign patent documents submitted with the above-identified papers) with a statement that such copy is a complete and accurate copy of the originally submitted documents. If applicant provides such a copy of the above-identified papers and statement within **THREE MONTHS** of the mail date of this Office action, the Office will add the original mailroom date and use the copy provided by applicant as the permanent Office record of the above-identified papers in place of the copy made by the Office. Otherwise, the Office's copy will be used as the permanent Office record of the above-identified papers (*i.e.*, the Office will use the copy of the above-identified papers made by the Office for examination and all other purposes). This three-month period is not extendable.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Berggren (US005002720) discloses a method for detecting neutrons corresponding to the illustrated device (Fig. 1) comprising the steps of providing a detection body **114** disposed between electrodes **110**, **112** wherein the detection body comprises boron nitride (column 10, lines 16-17) and exposing the detection body **114** to thermal neutrons along the direction **122**, and measuring a signal (with the illustrated circuit elements) as a result of a process within the boron nitride, but the process

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is wherein neutrons incident on uranium layer **116** are converted to a plurality of detectable energetic charged particles (fission fragments) which, in turn, deposit their energy in the boron nitride detection body **114**.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Constantine Hannaher whose telephone number is (703) 308-4850. The examiner can normally be reached on Monday-Friday with flexible hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ch
June 18, 2003


Constantine Hannaher
Primary Examiner